

Integrated Pump Control SCADA RTU

Pre-Engineered Water and Wastewater Remote Pump Control Application Package



Single program offers performance and simplicity for monitoring and control of remote water and wastewater applications

- Well station
- Remote tank level control
- Reservoir Control
- Duplex Lift or Booster station
- Triplex Lift or Booster station

This standard pre-programmed application leverages our decades of experience monitoring and controlling remote pumps in a wide variety of water and wastewater sites in North America and throughout the world. The standard application can be used with the appropriate Bristol™ ControlWave® PLC/RTU, from Emerson Process Management to meet the I/O requirements at the various sites. The combined solution offers a cost effective system that is ready to deploy without the typical programming overhead.

Benefits:

- Pre-programmed package eliminates the need for custom programming
- One package for one to three pumps provides consistency for operators and technicians
- Local Display/Keypad Operator Interface panel for on-site system control
- Alarm and historical data reporting for full SCADA integration
- Multiple pump scenarios allow flexibility to meet a wide range of applications
- Pump start/stop as well as VFD speed control
- Easy-to-use web page station configuration and setup
- Easily interfaces to field devices and sensors
- Security and water quality functions can be easily added as needed

Plant managers will take maximum advantage of the flexibility and maintenance personnel will appreciate the simplicity of the Bristol ControlWave pump control application. All remote water and wastewater applications have the same requirements to automatically control one or more pumps to maintain level, pressure and/or flow. Some sites may also have the need to control chemical feed, measure rain level, and detect intrusion events. All of these are pre-programmed and available for use to customize for the specific site.

When the application requires modifications or additions to the standard program, Bristol ControlWave Designer allows unlimited customization by your engineering staff or other integrators.

Specifications

Well or Reservoir

Digital inputs:

- Pump 1 status
- Pump Remote/Local

Digital outputs:

- Pump start
- Pump Stop

Analog inputs:

- Station flow
- Well drawdown
- Outlet pressure
- Chlorine residual
- Clearwell level or tank level

Analog outputs:

- VFD speed control
- Chemical feed pump

Counter inputs:

- Station flow
- Rain gauge



*ControlWave ExpressPAC
SCADA Package*

Duplex Booster or Lift Station

Digital inputs:

- Pump 1 & 2 status
- Pump 1 & 2 Remote/Local
- 2 tank level DI
- Intrusion or Motion

Digital outputs:

- Pump 1 & 2 start
- Pump 1 & 2 Stop

Analog inputs:

- Station flow
- Inlet pressure
- Outlet pressure
- Chlorine residual
- Clearwell level or tank level



*ControlWave Micro
PLC/RTU*

Analog outputs:

- VFD speed control
- Chemical feed pump

Counter inputs:

- Station flow
- Rain gauge

Triplex Booster or Lift Station

Digital inputs:

- Pump 1, 2 & 3 status
- Pump 1, 2 & 3 Remote/Local
- 2 tank level DI
- Intrusion or Motion

Digital outputs:

- Pump 1, 2 & 3 start
- Pump 1, 2 & 3 Stop

Analog inputs:

- Station flow
- Inlet pressure
- Outlet pressure
- Chlorine residual
- Clearwell level or tank level



*ControlWave Micro
PLC/RTU SCADA Package*

Analog outputs:

- VFD speed control
- Chemical feed pump

Counter inputs:

- Station flow
- Rain gauge

SCADA Packages

The ControlWave Micro and ControlWave Express-PAC integrated SCADA packages are designed and built for out-of-the-box installation and startup. The assemblies are fully integrated units that combine the PLC/RTU with a variety of options commonly required in SCADA applications. These include a NEMA 4X rated enclosure, power supply and battery backup options, termination options, display and operator input options, and wireless communication options.



*ControlWave Micro
PLC/RTU SCADA Package*

The ControlWave SCADA packages with the pre-programmed pump controller application are ideal for integrating remote site measurement and control into the SCADA system.

Station Control Strategies:

Level control

Pressure control

Time control

Pump lead/lag and pump alteration

Pump interlock and permissive conditions

Manual and PID VFD Control

Historical Archive

Historical data is stored in three archive files in the ControlWave PLC/RTU flash memory. This ensures maximum data integrity even in the event of a SCADA communication network failure. The historical data archives may be collected periodically on a scheduled or demand basis by the OpenBSI Harvester utility. This technique also minimizes communication bandwidth requirements significantly benefiting radio and cellular network architectures.

Daily Archive:

Stores 35 days of time-stamped minimums, maximums, averages and totals

Hourly Archive:

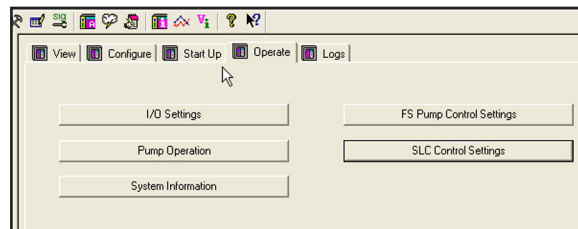
Stores hourly time-stamped minimums, maximums, averages and totals

Trend Archive:

The Trend Archive stores instantaneous values at a fixed period from one minute to sixty minutes.

Setup and Configuration

As mentioned earlier, the ControlWave pump control SCADA application is pre-programmed. The unit only needs site specific configuration through the easy-to-use set of web pages supplied with the application software. These configuration web pages are accessible through the OpenBSI TechView utility.



TechView allows easy connection to any ControlWave PLC/RTU through serial or Ethernet ports. The utility is essentially a web page browser that really simplifies menu navigation and PLC/RTU configuration.

The initial configuration setup is presented in a step-by-step procedure using a question and answer format. Once familiar with the procedures, individual configuration pages can easily be accessed rather than using the Q & A format.

Configuration Wizard

Select a Device: [Dropdown] Configure

STATION FLOW

Is there flow measured at this site? **Yes** No?

Would you like to estimate flow based on pump run status at this site? Estimated Not Available

How is flow totalization performed? ANALOG Pulse Counts?

BACK NEXT FINISH

Bristol ControlWave Pump Station Controller EMERSON

Q & A Configuration

Configuration Wizard

Select a Device: [Dropdown] Configure

LEAD/LAG CONTROLLER

AUTO/MANUAL: AUTO ? MANUAL

MODE: NOT AVAILABLE

PUMPS AVAILABLE: 3

START COMMAND STOP COMMAND

LEAD PUMP: ON OFF

LAG 1 PUMP: ON ON

LAG 2 PUMP: ON OFF

PUMP CONTROLS

PUMP NAME: PUMP1 PUMP2 PUMP3

RANK: 1 0 0

RUNTIME: 0.0 0.0 0.0

BACK NEXT FINISH

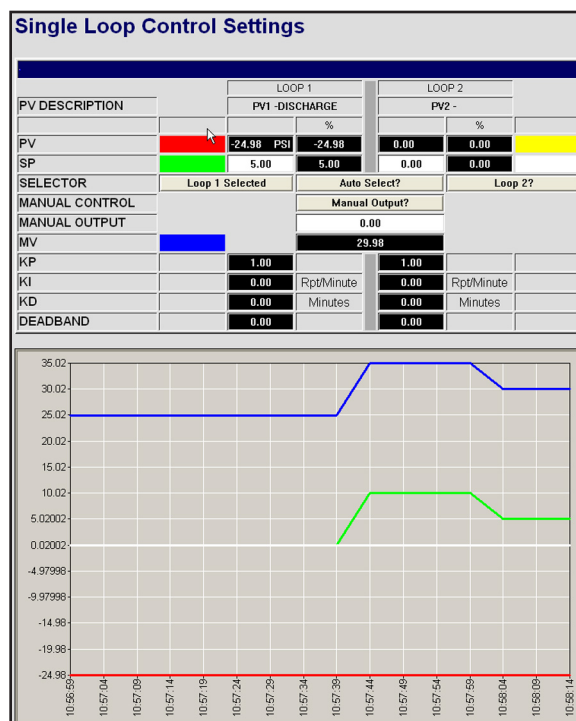
Bristol ControlWave Pump Station Controller EMERSON

Configuration Page

The configuration pages allow you to set the communication address and parameters, select station control mode parameters, enter setpoints and alarm limits, modify zero and span for analog inputs, add permissives and interlocks, and perform pump startups.

ANALOG INPUTS		ALARM LIMITS				
DEVICE	VALUE	AI POINT	ZERO	SPAN	UNITS	DESCRIPTOR
FLOW	0.000	Fixed	0.000	100.000	GPM	FLOW
SUCTION PRESSURE	-24.986	AI 2	0.000	100.000	PSI	SUCTION
DISCHARGE PRESSURE	-24.980	AI 3	0.000	100.000	PSI	DISCHARGE
CL2 RESIDUAL	0.000	Zero	0.000	100.000	ppm	CL2 RESIDUAL
REMOTE LEVEL	0.000		0.000	100.000	FEET	RESERVOIR
LEVEL	0.000	Zero	0.000	100.000	FEET	CLEARWELL
VOLUME	0.000		0.000	100.000	MGAL	CLEARWELL VOLUME
WELL DRAWDOWN LEVEL	0.000	Zero	0.000	100.000	FEET	DRAWDOWN
VFD SPEED FEEDBACK	0.000	Zero	0.0	100.0	%	VFD 1

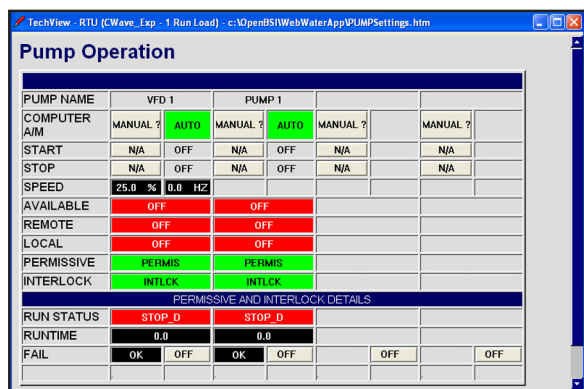
I/O Configuration



Loop Control Page

A station overview display is also provided to show pump run status, local/remote operation, and instantaneous values of pressure, flow and level.

Setup and configuration may also be performed from the integral display/keypad on the ControlWave PLC/RTU SCADA package or via the SCADA system host HMI. All configuration parameters are made available to OPC servers for compatibility with our OpenEnterprise SCADA software as well as third party SCADA software packages.



Software components

The ControlWave pump control application is available pre-installed in a ControlWave Micro or Express PLC/RTU. A modifiable version is available allowing program additions, but does not allow modifications to the pump control program itself. There is also a complete source version that allows unlimited modification of the pump control program. These three offerings provide the flexibility to meet the needs of wide range of users, technicians and engineers.

Products for expanded functionality

The pump control SCADA package can be combined with a variety of additional products that facilitate integration or provide even greater functionality.

Process Measurement Transmitters Bristol 2808 & 3808

- 2808 analog pressure transmitter for tank level measurement
- 3808 digital DP transmitter for flow measurement
- Adjustable ranges
- High accuracy
- Two year warranty
- Local indicator option

KPSI™ Submersible Level Transducers

- Tank and wet well level measurement
- 5 to 700 feet
- .05% to 1 % full scale accuracy
- Non-fouling diaphragm options for lift station applications
- 4-20 mA or 0-5 V output

AquaSensors™ Water Quality Instruments

The AquaSensors DataStick™ provides a cost-effective plug and play analytical measurement system for continuous use in industrial environments. DataStick communicates with ControlWave via a preconfigured serial Modbus function block.

- Direct measurement of pH, reagent free residual chlorine, dissolved oxygen, ORP or turbidity
- 11" CPVC direct insertion probe
- 10-30 Vdc, <200 mW

Censar® Six-Cense® multiparameter in-line sensor measures in real time (pH, ORP, conductivity, dissolved oxygen, free chlorine, and temperature)

- Direct insertion into pressurized main 2 inches to 72 inches in diameter
- Operates under working pressures up to 230 psi
- Reagent-free measurement of Chlorine
- Measures Monochloramine for plants using chloramination
- Low maintenance, low cost sensor replacement

Security Vision application package

- Pre and post event video capture and replay
- Pre-programmed function block provides all video file/folder manipulation
- OpenBSI Utility for collection and replay of captured events
- IP enabled network video camera with FTP server
- Facility entry access control and reporting

OpenEnterprise SCADA Host

The OpenEnterprise SCADA software provides a turnkey SCADA solution from field equipment to Supervisory Control, Management Reporting and Enterprise wide data distribution. OpenEnterprise is the tool that links Projects, Operations, Accounts and Management, making SCADA a part of the business process.

- Real-time Relational Object Oriented Database
- Included Historian with backfill capability
- Advanced 'state of the art' graphics builder
- Powerful reporting tools
- Alarm and Event Manager
- Open standards support for SQL, ODBC/ADO, Java DBC, OPC OLE & HDA, DDE, VB
- Thin client options for corporate and operational users
- OPC data access direct from database
- Fault tolerant and distributed servers over WAN or LAN

Related specification documents:

ControlWave Micro – 420ds5k.pdf
ControlWave ExpressPAC - 420ds7c.pdf
ControlWave Micro Enclosures – 420ds0d.pdf
ControlWave Designer – 420ds3d.pdf
Security Vision – 454ds11b.pdf
OpenEnterprise – 450ds1b.pdf

Water Quality and SCADA security on the www.ControlWave.com web site.

Complete specifications are available on the www.EmersonProcess.com/Remote web site.

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AquaSensors and DataStick are trademarks of AquaSensors, Brookfield, WI.

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